

What is claimed is:

1. A dual polarization transmission receiving
2 system for canceling cross-polarization interference,
3 comprising:

4 reception means including two RF local
5 oscillators which receive signals transmitted by using
6 two orthogonal polarized waves (V and H polarized waves)
7 and convert the respective received signals into IF
8 (Immediate Frequency) signals; and

9 demodulation means for branching each IF
10 signal into two paths, and then demodulating the
11 respective IF signals for each polarized wave by a
12 digital coherent detection scheme, wherein

13 said demodulation means for each polarized
14 wave extracts a phase noise component from a demodulated
15 output signal, divides the component into DC and AC
16 components, and suppresses a phase noise amount received
17 from an RF local oscillator for an orthogonally
18 polarized wave (different polarized wave) relative to a
19 polarized wave (self polarized wave) as a compensation
20 target in said demodulation means for each polarized
21 wave by using a phase control signal obtained by
22 interchanging the DC and AC components between the
23 respective polarized waves.

2. A system according to claim 1, wherein said

2 two RF local oscillators are synchronized at the same
3 frequency by a common reference oscillator with a
4 redundant arrangement.

3. A system according to claim 1, wherein said
2 demodulation means extracts a phase noise component from
3 a demodulated output signal, divides the component into
4 DC and AC components, and generates the phase control
5 signal by receiving an AC component from said
6 demodulation means for the other polarized wave (V
7 polarized wave or H polarized wave) and interchanging
8 the AC components.

4. A system according to claim 1, wherein said
2 demodulation means comprises:
3 a common IF local oscillator which
4 frequency-converts each of the branched IF signals;
5 two A/D converters which convert the
6 respective frequency-converted signals into digital
7 signals;
8 two demodulation circuits which demodulate the
9 respective digital signals;
10 an equalizer which equalizes a waveform of a
11 demodulated signal of a self polarized wave as a
12 compensation target;
13 an XPIC (Cross-Polarization Interference
14 Cancel r) which generates a replica signal of an

15 interfer nc component from a different polariz d wave
16 with respect to a demodulated signal on a different
17 polarization side;
18 an adder which outputs a demodulated signal by
19 adding an error signal output from said equalizer and a
20 replica signal output from said XPIC;
21 a control circuit which generates an APC
22 (Automatic Phase Control) signal corresponding to a
23 shift of a carrier frequency from the demodulated
24 signal;
25 a divider which receives the APC signal output
26 from said control circuit and divides the signal into DC
27 and AC components; and
28 a combiner which outputs the phase control
29 signal obtained by interchanging the DC and AC
30 components between the respective polarized waves.

5. A system according to claim 4, wherein said
2 demodulation means outputs the APC signal, output from
3 said control circuit, to said demodulation circuit which
4 demodulates a self polarized wave digital signal, and
5 also outputs the phase control signal, obtained by
6 combining a DC component output from said divider and an
7 AC component output from said demodulation means for the
8 other polarized wave (V polarized wave or H polarized
9 wave), to said demodulation circuit which demodulates a
10 different polariz d wav digital signal.

6. A dual polarization transmission receiving
2 system comprising:
3 first and second RF (Radio Frequency) mixers
4 which convert signals transmitted by using two
5 orthogonal polarized waves (V polarized wave and H
6 polarized wave) into IF (Immediate Frequency) signals;
7 first and second RF local oscillators which
8 are phase-controlled by a common reference signal;
9 a common IF local oscillator and first and
10 second IF mixers which branch each IF signal into two
11 paths and perform digital coherent detection for each of
12 the IF signals for each polarized wave;
13 first and second A/D converters which convert
14 the respective signals having undergone digital coherent
15 detection into digital signals;
16 first and second demodulation circuits which
17 demodulate the respective converted signals;
18 an equalizer which equalizes a waveform of a
19 demodulated signal of a polarized wave (self polarized
20 wave) as a compensation target;
21 an XPIC (Cross-Polarization Interference
22 Canceler) which generates a replica signal of an
23 interference component from a different polarized wave
24 with respect to a demodulated signal on a different
25 polarization side relative to the self polarized wave;
26 an adder which outputs a demodulated signal by

27 adding an error signal output from said equalizer to a
28 replica signal output from said XPIC;
29 a control circuit which generates an APC
30 (Automatic Phase Control) signal corresponding to a
31 shift of a carrier frequency from the demodulated signal
32 and outputs the signal to said first demodulation
33 circuit on the self polarization side;
34 a divider which divides the APC signal into DC
35 and AC components; and
36 a combiner which generates a phase control
37 signal by interchanging an AC component output from a
38 divider for the other polarized wave between the two
39 polarized waves, and outputs the signal to said second
40 demodulation circuit on the different polarization side.

7. A local oscillator phase noise reduction
2 method for a dual polarization transmission receiving
3 system, comprising:
4 the first step of converting signals
5 transmitted by using two orthogonal polarized waves (V
6 polarized wave and H polarized wave) into IF (Immediate
7 Frequency) signals;
8 the second step of branching each IF signal
9 into two paths and then demodulating each of the IF
10 signals for each polarized wave by a digital coherent
11 detection scheme;
12 the third step of extracting a phase noise

13 component from the demodulated output signal and
14 dividing the component into DC and AC components;
15 the fourth step of generating a phase control
16 signal by receiving an AC component of the other
17 polarized wave and interchanging the AC components
18 between the two polarized waves; and
19 the fifth step of generating a replica signal
20 of an interference component from a different polarized
21 wave for a demodulated signal on a different
22 polarization side relative to a self polarized wave on
23 the basis of the phase control signal in order to
24 suppress a phase noise amount received from an
25 orthogonally polarized wave (different polarized wave)
26 relative to a polarized wave (self polarized wave) as a
27 compensation target.

8. A method according to claim 7, wherein
2 the second step includes:
3 the step of frequency-converting each of the
4 branched IF signals;
5 the step of converting the respective
6 frequency-converted signals into digital signals;
7 the step of demodulating the respective
8 digital signals;
9 the step of performing waveform equalization
10 of a demodulated signal of a self polarized wave as a
11 compensation target;

12 the step of generating a replica signal of an
13 interference component from a different polarized wave
14 with respect to a demodulated signal on a different
15 polarization side; and
16 the step of outputting a demodulated signal by
17 adding an error signal based on the waveform
18 equalization and the replica signal, and
19 the third step includes:
20 the step of generating an APC (Automatic Phase
21 Control) signal corresponding to a shift of a carrier
22 frequency from the demodulated signal; and
23 the step of dividing the APC signal into DC
24 and AC components.